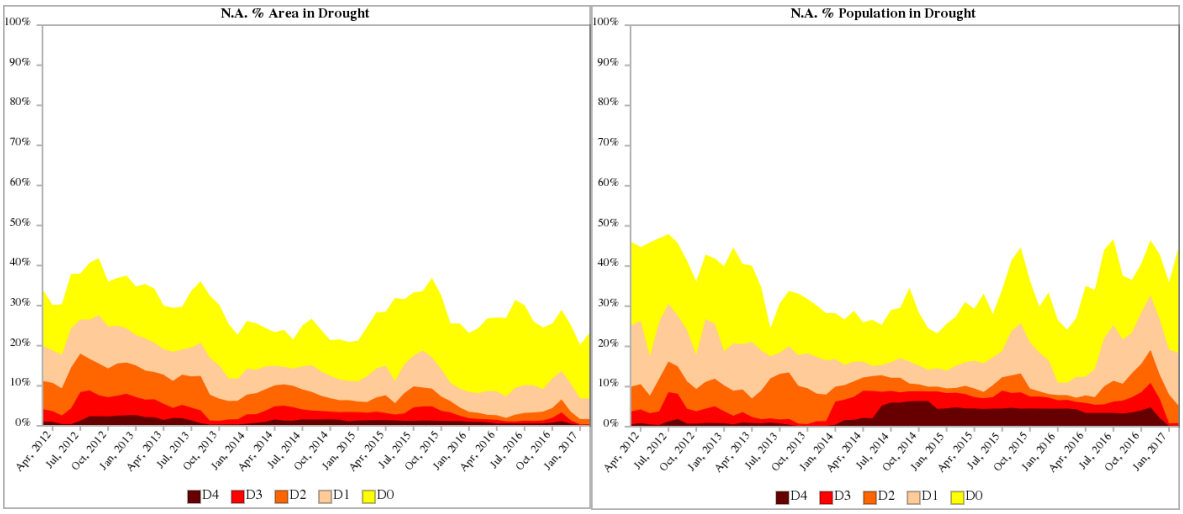
North American Drought Monitor – February 2017

At the end of February 2017, moderate to exceptional drought (D1-D4) affected approximately 6.7% of the area and 18.3% of the population of North America. The percent area value is the same as the value for the end of January 2017, and the percent population value is 0.8% less than the value for the end of January.



CANADA: Drought conditions continued to diminish in February, as most regions with lingering drought impacts or precipitation deficits received significant snowfall. Temperatures remained above normal for much of Canada, with the exception of British Columbia, which experienced colder-than-average conditions. Despite the improving conditions throughout much of the country, deterioration in Alberta's central and northern regions was due to a low snowpack and continued below-normal snowfall. Conditions in southeastern Ontario continued to improve; however, moderate drought developed north of this region along the border between Ontario and Quebec. Moderate drought persisted in northwestern British Columbia and small sections of southeastern Ontario and southwestern Nova Scotia due to long-term precipitation deficits.

Western: Similar to the previous month's assessment, drought conditions in British Columbia were confined to the northern half of the province and remained relatively unchanged. Regional snow pillow data showed record-low winter precipitation across much of northern British Columbia, and the Abnormally Dry (D0) pocket was expanded to reflect this. Satellite-derived data indicated that a large area in northwestern B.C. received less than 50% of the fourteen-year average over the past 90 days, resulting in the Moderate Drought (D1) pocket in this region being expanded. Some improvement was seen on Haida Gwaii and surrounding Prince Rupert; thus, these areas were improved to D0.

The Prairie Region had a dry month, contributing to a dry winter. However, conditions in Alberta continued to deteriorate, with an Abnormally Dry (D0) pocket enveloping a large portion of the province. Satellite-derived data indicated that small areas north of Medicine Hat and northeast of Grande Prairie have been experiencing significant dryness over the past few months, resulting in the development of two small D1 pockets. Despite a low

snowpack, spring soil moisture concerns have not yet emerged in Saskatchewan and Manitoba due to good soil saturation at the end of the growing season and at the time of freezing.

Central: Most of Central Canada continued to benefit from adequate precipitation throughout February. Conditions in southeastern Ontario improved, with Barrie, Peterborough, and Waterloo returning to normal conditions and the Moderate Drought (D1) pockets being pulled back to two tiny pockets around Kingston, Niagara Falls and North Bay. Dryness shifted northward along the border between eastern Ontario and western Quebec. Precipitation indices showed severe dryness north of Rouyn-Noranda in Quebec, resulting in the development of a D1 pocket in this region. Southern Quebec continued to experience above-average precipitation, and the Abnormally Dry (D0) pocket shrunk to a small area south of Montreal. The D0 pockets in northern Quebec persisted due to continued precipitation deficits.

Atlantic: Conditions in Atlantic Canada remained relatively unchanged throughout February. Above-average precipitation in southern New Brunswick led to the shrinking of the Abnormally Dry (D0) pocket to a small region in the southwest. A small D0 pocket was added east of Grand Falls due to an abnormally dry winter in this area. Long-term drought persisted in a tiny pocket of southwestern Nova Scotia. Southwestern Newfoundland has received extremely low precipitation since the end of the growing season; thus, a D0 pocket was added. The D0 pockets in Labrador persisted due to continued precipitation deficits.

Northern: Conditions in Northern Canada remained relatively unchanged throughout February. A D0 pocket continued to envelop southern Yukon Territory. Satellite-derived data showed dryness in eastern Yukon; thus, the Abnormally Dry (D0) pocket in Yukon Territory grew eastward towards the NWT border.

UNITED STATES: Historic February warmth brought winter wheat out of dormancy as far north as the central Plains and the lower Midwest, and left many fruit crops in bloom by month's end across the South. Monthly temperatures averaged at least 10°F above normal at many individual locations across the eastern half of the U.S., shattering February average temperature station records that had been set as far back as 1882, 1890, 1925, 1930, and 1932. Only the northwestern corner of the country, including Washington, was cooler than average, but even there February was far less harsh than December and January.

The U.S. warmth was in part supported by the continuation of an active Pacific jet stream that often took aim on northern and central California. As a result, California's 5-year drought all but disappeared, replaced by waves of heavy precipitation that threatened the auxiliary spillway of the nation's tallest dam (Oroville); pressured and sometimes overtopped levees in the Central Valley; and sparked some of the worst flooding on record in San Jose and environs. By the end of February, the average water content of the Sierra Nevada snowpack stood at 45 inches (1,143 mm), 185 percent of normal. The bounty extended beyond California to most other areas of the West, maintaining favorable spring and summer water-supply prospects.

While parts of the central and eastern U.S. also experienced periods of stormy weather, erratic showers (and early-season warmth) contributed to some drought development or intensification from the central and southern Plains to the middle and southern Atlantic States. By February 26, at least one-fifth of the winter wheat was rated very poor to poor in Colorado (27 percent), Kansas (21 percent), and Texas (20 percent), accompanied by a general increase in late-winter wildfires across the central and southern Plains. Farther east, drought worsened anew in the southern Appalachians and neighboring areas, where winter rainfall failed to vanquish long-term precipitation deficits. And, a warm, mostly dry winter across Florida's peninsula maintained heavy agricultural irrigation demands.

Most of the Midwest continued to experience a relatively benign winter, with periods of record warmth interspersed with brief episodes of rain or snow. Although the Midwest remained largely free of drought, topsoil moisture shortages became more apparent in the southern Corn Belt. Elsewhere, New England endured a period of wintry weather, culminating in major snow accumulations on February 9 and 12-13. However, only a few days later, sudden warmth melted much of New England's snow.

Contiguous U.S. drought (D1 or worse) coverage dipped to a winter minimum of 13.54% in mid-February, then rose slightly to 14.08% on February 28. More notably, U.S. coverage of extreme to exceptional drought (D3 to D4) dipped to 0.34% of the Lower 48 States on February 7 and 21, the lowest such area since October 5, 2010. And, exceptional drought was completely absent from the U.S. in February—the first full month without D4 coverage since March 2011.

The major factor behind the general decrease in drought coverage was the onslaught of Pacific storms into the West. By February 21, California was free of extreme drought (D3) for the first time since August 6, 2013. And, drought (D1 or worse) covered just 8.73% of California on February 28, down from 73.04% as recently as December 13, 2016, and down from 100% during much of 2014. It was also California's least amount of drought since December 27, 2011.

Despite the lack of Western drought, strips and pockets of drought persisted or intensified across the central and southern Plains, the mid-South, and the East. By February 28, coverage of severe drought or worse included 76% of Connecticut, 45% in New Hampshire, and 37% in Massachusetts. Oklahoma led the Plains with 29% coverage of severe to extreme drought (D2 to D3). In the Southeast, Alabama topped the list with 32% coverage of D2 to D3, followed by Georgia (19%), Arkansas (18%), South Carolina (18%), and North Carolina (16%).

Outside of the contiguous U.S., abnormal dryness (D0) returned to Puerto Rico during February, covering 46% of the commonwealth by month's end. Puerto Rico's dryness was limited to eastern areas and along the southern coast. Meanwhile, Alaska also noted an increase in D0 coverage during February, from 9 to 35% of the state. Alaska's dryness was focused across central and southern sections of the mainland. Finally, leeward sections of the Big Island of Hawaii experienced a return of moderate drought (D1) during February. Overall, Hawaii's statewide drought coverage increased to 7% by February 28. However,

due to wet weather on the other Hawaiian Islands, statewide coverage of D0 or worse dipped from 56 to 28%.

Historical Perspective: According to preliminary information provided by the National Centers for Environmental Information, the contiguous U.S. experienced its second-warmest, 50th-wettest February during the 1895-2017 period of record. The nation's February average temperature of 41.2°F (5.1°C) was 7.3°F (4.1°C) above the 20th century mean, while precipitation averaged 2.21 inches (56 mm)—104 percent of normal. The only warmer February on record occurred in 1954, when the temperature averaged 41.4°F (5.2°C). February 1930, with an average of 40.1°F (4.5°C), dropped to third place.

Statewide temperature rankings ranged from the 30th-coldest February in Washington to the warmest February on record in 16 states across the South, East, and lower Midwest—stretching from Texas to the Atlantic Coast States from North Carolina to New York. In fact, top-ten rankings for February warmth were noted in all states except Maine and the nine states along and northwest of a line from California to the Dakotas. Meanwhile, state precipitation rankings ranged from the fourth-driest February in Virginia to the third-wettest February in Idaho. Top-ten rankings for February dryness were also noted in Illinois, Missouri, Delaware, Maryland, and the Carolinas, while top-ten values for February wetness were recorded in Montana, Oregon, Washington, and Wyoming. Although it was only California's 13th-wettest February, the season-to-date (October-February) statewide average precipitation of 27.81 inches, or 706 mm (179 percent of normal), supplanted the 1968-69 record of 27.34 inches (694 mm).

Meanwhile, the contiguous U.S. experienced its sixth-warmest, eighth-wettest winter during the 122-year period of record. The general warmth of the winter of 2016-17 followed the nation's warmest winter on record (in 2015-16), while widespread storminess resulted in the wettest winter since 1997-98. The nation's winter average temperature of 35.9°F (2.2°C) was 3.7°F (2.0°C) above the 20th century mean, while precipitation averaged 8.22 inches (209 mm)—121 percent of normal.

Statewide temperature rankings ranged from the 15th-coldest winter in Washington to the warmest winter on record in Louisiana and Texas. It was among the ten warmest winters in Arizona, New Mexico, and Oklahoma, as well as every state bordering the Mississippi River to the Atlantic Coast. Meanwhile, precipitation rankings ranged from the tenth-driest winter in Missouri to the wettest winter on record in Nevada and Wyoming. Top-ten rankings for winter wetness occurred in five Western and three Northern States. For California, it was the second-wettest winter behind only 1968-69.

Agricultural and Hydrological Highlights: By February 28, more than one-fifth (22%) of the U.S. winter wheat production area was in drought. Similar percentages of drought coverage were noted with regard to U.S. hay production (20%) and the U.S. cattle inventory (19%).

Drought effects on wheat were most pronounced across the central and southern Plains. On February 26, the U.S. Department of Agriculture reported that at least one-fifth of the crop

was rated in very poor to poor condition in Colorado (27%), Kansas (21%), and Texas (20%).

On March 1, 2017, reservoir storage as a percent of average for the date was near or above average in all Western States except New Mexico and Washington. New Mexico's low storage was a combination of several factors, including the lingering effects of a multi-decadal drought and overtaxed water supplies. Hydrologically, Washington has fewer concerns, and in fact continued to prepare for robust spring and summer runoff by keeping some reservoirs low. Meanwhile, California's statewide storage reached 122% of average for the date by March 1, topping 120% for the first time since December 2011.

MÉXICO: February 2017 was ranked as the 19th-driest February, according to data since 1941. The monthly accumulated precipitation of 11.0 mm at the national level was 60.5% of 1941-2016 mean. Seven frontal passages and three winter storms dominated the weather in February; five of these frontal systems in addition to winter storms brought above-normal rainfall only in the northwest, north, and northeast. Across the rest of the country, rainfall was much below the mean.

As a result of scarce winter rains, the national percent in drought increased. The drought assessment on February 28, 2017, showed 9.98% of Mexico in moderate to extreme drought (D1-D3), 2.76% more than the previous month, with drought areas are located mainly in central, southern and the southeastern Mexico.

In the southeast, the main drought-affected state was Tabasco, which experienced their second-driest September-February, and their third-driest December-February period over the past 76 years. As a result, moderate to severe drought coverage (D1-D2) expanded from 38.5 to 70.7% of Tabasco. To the south, Oaxaca recorded their third-driest September–February, and is the only state in the country with extreme drought (D3). The coverage of moderate to extreme drought (D1-D3) in Oaxaca included 50.9% of the state. Guerrero and Oaxaca recorded their eighth- and seventh-driest December-February, respectively, and coverage of moderate to severe drought (D1-D2) increased from 26.1 to 35.2% in Guerrero. In the central region, Mexico City had its driest February on record, with moderate drought (D1) covering 13% of its area. Guanajuato and Queretaro, which were free of drought in the previous assessment, now show D1-D2 coverage of 17.9% in Guanajuato and D1 coverage of 3.1% in Querétaro. In the Yucatan Peninsula, moderate drought increased slightly from 22.4 to 27.9%. Other drought regions included the western, northern, and eastern parts of the country. In contrast, winter rains were favorable in the northwest, where the long-term drought decreased. In Baja California coverage with moderate to severe drought (D1-D2) changed from 22.6 to 6.1%, while coverage in Sonora decreased from 8.8 to 5.6%.

With a mean temperature of 19.2°C, 1.4°C above the 1981-2010 average, February 2017 tied with 2006 as the warmest February on record, according to data since 1971. With the exception of areas in northern Baja California, Sinaloa, the Chihuahua-Durango region, Michoacán State, and Guerrero and Oaxaca, the country experienced temperatures well above normal. The largest positive anomalies, greater than +5°C, were observed over the

Sierra Madre Oriental (southern Chihuahua and western Durango) and most of northeast Coahuila, northern Nuevo León, and Tamaulipas. In spite of convective activity in the northwest, anomalies were also between 2 and 3°C above the mean. The northeastern states—Coahuila, Nuevo León, Tamaulipas, and San Luis Potosi—recorded their warmest February. It was also the warmest February for southeastern states—Campeche, Chiapas, Tabasco, and Quintana Roo—in addition to Querétaro in the central region.

In response to the high temperatures and low rainfall, around 32,662.94 hectares were reported as burned by forest fires from January 1 to March 9, 2017, mainly in the states of Mexico, Puebla, Mexico City, Michoacán, Hidalgo, Morelos, Oaxaca, Jalisco, and Chiapas, which together accounted for 81% of the national area burned. This period had the third-largest area burned, behind only 1998 (78,349.4 hectares) and 2013 (40,612.8 hectares), according to statistics from the National Forestry Commission (CONAFOR). In parts of southern Mexico experiencing long-term drought, four states—Michoacán, Guerrero, Oaxaca, and Chiapas—were among the top ten states in area burned. And, Oaxaca, with 10,836.25 hectares burned, accounted for about one-third of the year-to-date total.

According to the Information Service for Agri-food and Fisheries (SIAP), nearly 3.3 million hectares has been planted by February during the fall-winter season; this is 6.4% lower than a year ago. Main planted crops include corn, sorghum and wheat, which together accounted for 74.7% of that total. Elsewhere, an increase of 5.2% was reported in perennial crops, with sugar cane, alfalfa, and oranges providing 93.5% of the total. Regarding livestock, bovine meat and milk production continued a growth tendency of 2.1 and 1.9%, respectively, in the first 2 months of the year, compared to a year ago.